

SPECIFICATION

TO WHOM IT MAY CONCERN

BE IT KNOWN THAT:

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have invented new and useful improvements in

Collapsible Open Top Swing With Leg Axis Offset From Swing Axis

of which the following is a specification

Collapsible Open Top Swing With Leg Axis Offset From Swing Axis

The present invention relates generally to baby swings, particularly to open top swings, and specifically to open top swings that have front and rear legs that are swingable relative to each other such that the open top swing is collapsible from an open position to a closed position.

BACKGROUND OF THE INVENTION

An open top swing is a baby swing having no crossbar or cross support over a top portion of the swing. The open top of the open top swing provides a convenient and safe way to pick up an infant or toddler. The open top is convenient because the caregiver can approach the infant easily to provide care. The open top is safe because, without a crossbar across the top of the swing, placing the infant or toddler in the baby seat and taking the infant or toddler out of the baby seat can be done easily and without a struggle. For example, the feet of a toddler or infant may get caught in a portion of the seat, especially the feet of a struggling toddler or a sleeping infant. With a conventional baby swing having a top extending crossbar, a struggling toddler or sleeping child would be lifted a slight way up so that his or her feet would clear the seat and then lifted horizontally across the baby seat so as not to hit the head of the child on the underside of the crossbar. However, with an open top swing, the horizontal lifting or the back-straining lift change from a vertical lift to a horizontal lift is unnecessary because the child may be lifted straight up out of the seat.

SUMMARY OF THE INVENTION

A feature of the present invention is an offset between a leg axis and a swing axis. The leg axis is an axis where a front leg of the swing is hinged to a rear leg of the swing. The swing axis is where hangers extending from the seat of the open top swing engage in a swinging fashion side portions of the frame. By offsetting the leg axis from the swing axis, the mechanics of the axis is simplified and a broader base can be provided for the open top swing.

Another feature of the present invention is the front leg engaging a unit for the leg axis and the front leg further engaging a unit for the swing axis. The unit for the leg axis is mounted at a first position on the front leg. The unit for the swing axis is mounted at a

second position rearwardly and upwardly relative to the first position where the leg axis is mounted.

Another feature of the present invention is a front leg and a rear leg having the same length and the same shape to minimize manufacturing and assembly costs and to provide for an aesthetic swing.

Another feature of the present invention is to provide, in the open position, a broad base with sweeping long rear legs and, in the closed position, a configuration where the front and rear legs lie parallel to each other and where the distal ends of the rear legs project beyond the distal ends of the front legs.

An advantage of the present invention is safety. Features that provide this advantage are the broad base having the sweeping long rear legs, a U-shaped cross support between lower portions of the front legs, and a mechanical separation of the leg axis from the swing (or seat) axis.

Another advantage of the present invention is convenience. The open top swing is collapsible via the leg axis to draw the open top swing into a more compact configuration that is easier to store in a car, van or closet.

Another advantage of the present invention is aesthetic. Features that provide this advantage are the long sweeping rear legs and the substantial match in shape and size between the front and rear legs.

Another advantage of the present invention is cost and simplicity. The open top swing is inexpensive and simple to manufacture, assemble, operate, maintain and repair.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of the present open top swing.

Figure 2A is a side elevational view of the open top swing collapsed to the closed position for storage.

Figure 2B is a side elevational view of the open top swing swung open to the open position.

Figure 3 is a top view of the open top swing and shows both units that house the swing axis about which the baby seat swings.

Figure 4 is a side detail view of the unit that houses the leg axis about which the front and rear legs swing.

DESCRIPTION

As shown in Figure 1, the present open top swing is generally designated by
5 reference numeral 10. The open top swing 10 includes a swing or seat axis 12, a leg or frame axis 14, a baby seat 16, hangers 18, a pair of front legs 20, a pair of rear legs 22, a drive unit or drive housing 24, and a passive unit or passive housing 26.

More specifically, the open top swing 10 includes a frame 28. The frame 28 includes the front leg 20. Front leg 20 is curved continuously from a proximal or upper
10 end 30 to a distal or lower end 32. Front leg 20 is tubular and is preferably a metal. The preferred metal is aluminum. Near the proximal or upper end 30, the front leg 20 mounts and supports a unit 34 that houses the leg axis 14. The unit 34 is plastic and includes a channel to receive the front leg 20. The unit 34 is fixed to the front leg 20 pin connectors
15 such as rivets or screws (as shown in Figure 4). The unit 34 is slid onto the front leg 20 such that the proximal or upper end 30 of the front leg 20 is exposed. After the unit 34 is engaged at a first position on the front leg 20, the proximal or upper end 30 is engaged with a female receiver 36 of one of the units 24, 26 via a quick connection, such as a resilient or spring biased ball or button catch, where the ball or button is housed in the proximal end 30, then is depressed when the end 30 is slid into the female receiver 36,
20 then pops out into an aperture formed in female receiver 36 to lock the front leg 20 to one of the units 24, 26. At its lower or distal end 32, the front leg 20 is integral with a first support member 38 and a second support member 40. First and second support members 38, 40 are tubular and are formed of a metal such as aluminum. First and second support members 38, 40 form a general U-shape. First support members 38 extend rearwardly
25 and inwardly from their respective front legs 20. Second support member 40 is integral with first support members 38 and extends transversely to the first support members 38. Second support member 40, as shown in Figures 2A and 2B, lies vertically directly underneath a middle portion of the baby seat 16. Lower or distal end 32 of front leg 20 includes a plastic guard 42. Guard 42 may snap over a front portion of the front leg 20
30 and underneath a front portion of the first support member 38. Guard 42 includes a

nonslip or antiskid protrusion 44. If desired, each of the front leg 20, first support member 38, and second support member 40 may be a separate tubular piece. The separate tubular pieces 20, 38 and 40 may engage each other via resilient or spring biased ball or button catches and male/female connections.

5 The frame 28 further includes the rear leg 22. The rear leg 22 is tubular and is preferably a metal. The preferred metal is aluminum. The rear leg 22 includes a proximal or upper end 46 and a distal or lower end 48. The rear leg 22 continuously curves from the upper end 46 to the lower end 48. The upper end 46 is hingedly fixed in the unit 34 via a pin connector at the leg axis 14. The upper end 46 of the rear leg 22
10 swings in the unit 34 from a side portion 50 of the unit 34, where the upper end 46 engages a thumb actuated spring biased tab catch or lock 52, to generally a middle portion of unit 34, where the upper end 46 engages another thumb actuated spring biased tab catch or lock 54. When the upper end 46 engages the thumb actuated spring biased tab catch or lock 52, the open top swing 10 is locked in an open and operating position.

15 When the upper end 46 engages the thumb actuated spring biased tab catch or lock 54, the open top swing 10 is locked in a closed and stowable position. The pin connector or leg axis 14 is the same distance from front leg 20 as the thumb actuated spring biased tab catch or lock 54 such that the rear leg 22 and front leg 20 are closed to a configuration where the front and rear legs 20 and 22 are parallel to each other. When the open top
20 swing 10 is in such closed position, the cross or second support member 40 and portions of the first support members 38 protrude between legs 22 and beyond, as shown in Figure 2A. Rear legs 22 further include a cross support member 56 integral with the rear legs 22 and extending between the distal ends 48 of the rear legs 22. Or, if desired, to provide for shipment and storage of the open top swing 10 in a compact form, cross support member
25 56 may be a separate piece from legs 22 and a connection between the distal ends 48 and ends of the cross support member 56 may be a male/female connection with resilient button catches to lock the legs 22 and cross support member 56 to each other. A plastic guard 58 may snap over a portion of lower end 48 and a portion of cross support member 56. Guard 58 includes a nonslip or antiskid protusion 60.

The frame 28 includes unit 34. Unit 34 is shown in greater detail in Figure 4. Here three pin connectors 62 are shown. Pin connectors 62 rigidly mount unit 34 on front leg 20. Further, it can be appreciated that side portion 50 of unit 34 extends over a sufficient distance to act as a stop for the rear leg 22 such that thumb actuated spring biased tab catch or lock 52 bears little if any of the weight of the baby in the baby seat 16 and such that the weight of the baby in the baby seat is borne by the structural housing of unit 34, and the front and rear legs 20, 22. Unit 34 further includes a pocket 64 to accommodate and receive the absolute terminus of end 46 as rear leg 22 swings between the open and closed positions.

The frame 28 further includes drive unit 24 and passive unit 26. Each of the units 24, 26 is plastic and is two piece, with the two pieces fixed together with pin connectors. Drive unit 24 houses a drive mechanism for swinging the hanger 18 depending from drive unit 24. As to the drive mechanism, U.S. Patent No. 5,846,136 issued to Wu on December 8, 1998 is hereby incorporated by reference in its entirety. Such a drive mechanism rotates an axle on axis 12, which swings a hanger mount 66, which swings its respective hanger 18, which swings the baby seat 16. The passive unit 26 does not include a drive mechanism, but includes axis 12, hanger mount 66 and hanger 18, which is fixed to the other side of the baby seat 16.

Baby seat 16 includes a back portion 68, a seat portion 70 and a removable tray 73.

Open top swing 10 includes an open top 72, as seen in Figure 1 and Figure 4. In other words, frame 28 includes one side portion defined by one front leg 20, the respective rear leg 22, the respective unit 34 mounting the legs 20, 22 to each other, and the passive unit 24. Also, the frame 28 includes the other side portion defined by the other front leg 20, the respective rear leg 22, the respective unit 34 mounting the legs 20, 22 to each other, and the passive unit 26. There is no cross support member extending between such the uppermost section of such side portions of the frame 28. For example, there is no cross support members extending between the uppermost sections or peaks of the units 24, 26. There is no cross support member extending between the upper ends of the front legs 20. There is no cross support member extending between the upper ends of

the rear legs 22. There is no cross support member extending directly above the seat 16, including the back portion 68 and the seat portion 70. The hangers 18 do not directly extend to each other. The hangers 18 extend rearwardly from the units 24, 26 when the seat 16 is at rest, as shown in Figure 1. Then the hangers 18 extend downwardly and subsequently forwardly to be fixed to a rear portion of the seat 16 such that the hangers 18 contribute to an open top for the swing 10. The only true cross support members for the swing 10 are 1) the combination of support members 38 and 40 between the lower ends 32 of the front legs 20 and 2) support member 56 between the lower ends 48 of the rear legs 22.

Figure 2A shows the open top swing 10 in a closed position, where rear leg 22 has been swung to a position parallel to front leg 20. In this position, the distal or lower end 48 is disposed beyond the distal or lower end 32 of front leg 20. Also in this position, the upper or proximal end 30 of front leg 20 is disposed beyond the upper or proximal end 46 of rear leg 22. Such a configuration permits the legs 20, 22 to be manufactured in the same size and shape, provides a long sweeping disposition for the rear legs 22 when in the open position as shown in Figure 2B, and permits the leg axis 14 to be offset from the swing axis 12.

In operation, assembly may be the first step. The open top swing 10 may arrive unassembled in a shipping carton. That is, the hanger mounts 66 are removably engagable with the hangers 18 and with their respective units 24, 26. The hangers 18 are removably engagable with the seat 16. Units 24 and 26 are fixed to their respective front legs 20 with a quick connection. Unit 34 is removably engagable from front leg 20 with pin connectors. Unit 34 is removably engagable from rear leg 22 with a pin connector. Support members 38 may be fixed to legs 20 with quick connections. Support members 38 may be fixed to cross support member 40 with quick connections. Cross support member 56 may be fixed to the lower ends 48 of rear legs 22 with quick connections. Guards 42 and 58 snap off their respective legs and support members.

After assembly, rear legs 22 may be swung between open and closed positions as shown in Figures 2A and 2B. In the open position, the drive mechanism may be operated to swing the seat 16. In the open position, access to the baby in the seat 16 is without

interference. In the open position, the rear sweeping legs 22 provide a relatively broad base for the swing 10 because the upper ends of the rear legs 22 are fixed relatively low on the front legs 20. In the open position, the side portions 50 of the units 34 transfer load from the units 34 to the rear legs 22.

5 To place the swing 10 in the closed position, thumb actuated spring biased tab catch or lock 52 is operated by the thumb so as to release rear leg 22. Rear leg 22 is then swung and automatically engages and automatically locks with thumb actuated spring biased tab catch or lock 54. To place the swing 10 back into the open position, thumb actuated spring biased tab catch or lock 54 is operated by the thumb so as to release rear
10 leg 22. Rear leg 22 is then swung and automatically engages and automatically locks with thumb actuated spring biased tab catch or lock 52, with a relatively long portion of upper end 46 coming into contact with an inside of unit 34, specifically edge portion 50.

It should be noted that the open top swing 10 may be stored with simply the rear legs 22 in the closed position, as shown in Figure 2A. Or, if desired, the swing 10 may be
15 taken apart piece by piece so as to separate cross support member 40 from support members 38, support members 38 from front legs 20, front legs 20 from unit 34, unit 34 from rear legs 22, rear legs 22 from cross support member 56, and units 24, 26 from the front legs 20. Further, if desired, hangers 18 may be separated from seat 16 and from their hanger mounts 66. Or the hanger mounts 66 may be remain on the hangers 18 and
20 the hanger mounts 66 may be separated from the units 24, 26.

It should be noted that the leg axis 14 and the swing axis 12 are preferably parallel to each other, but are not co-axial to each other.

Thus since the invention disclosed herein may be embodied in other specific forms without departing from the spirit or general characteristics thereof, some of which
25 forms have been indicated, the embodiments described herein are to be considered in all respects illustrative and not restrictive. The scope of the invention is to be indicated by the appended claims, rather than by the foregoing description, and all changes which come within the meaning and range of equivalents of the claims are intended to be embraced therein.